# SAFETY ELECTRICAL OUTLET AND SWITCH SYSTEM

## Cross-Reference to Related Applications

This application is a continuation of US Patent Application No. 09/553,425 filed April 19, 2000, which relates to and claims the benefit of prior provisional application 60/174,521 entitled Safety Electrical Wiring Assembly, filed January 5, 2000.

## Background of the Invention

Installation of a standard AC electrical system in a new residence or commercial site occurs in three phases, corresponding to the building construction. The rough phase corresponds to rough framing of the building, prior to attachment of wall panels to the frame. During this phase, blue boxes or similar electrical boxes are mounted to wall studs at predetermined locations, so that outlets are 18" and switches are 36" from the floor. Various box types are available, such as single-, double-, triple- or quadruple-wide configurations, among others. After the boxes are installed, a journeyman electrician, following a predetermined layout, routes Romex® brand or equivalent power cables through the framing to the appropriate boxes. A typical power cable has two solid core insulated conductors and a ground conductor, all surrounded by a non-metallic sheath. The power cable is fed through openings in the rear or sides of the electrical boxes. The journeyman typically labels the conductors by writing a code on the insulation that indicates the wiring connectivity and the type of module to be installed in each box. Then these cables are folded back into the boxes, unterminated, so as to be out of the way until the next phase. After all of the electrical wiring is routed in this manner, the electrical subcontractors leave the construction site, waiting for other subcontractors to finish their tasks.

The makeup phase corresponds to wall panel installation and painting. During this phase, the journeyman returns to the construction site to install modules into the electrical boxes. The journeyman retrieves the cable from each box, reviews the labeling, and connects the cable conductors to the appropriate module. One module choice is a duplex outlet that receives standard two-prong or three-prong grounded AC plugs. The outlet can be wired full-hot, where each outlet is always connected to power, or half-hot, where one

outlet is connected to power under control of a wall switch. Another module choice is a switch, which can be a standard on/off switch, a three-way switch or a dimmer switch, for example. After conductors are wired to a module, the module and attached conductors are pushed into the electrical box and the module is attached to the top and bottom of the box with screws. Once all modules are installed, the general contractor verifies the dwelling wiring against the electrical plans. If all of the wiring is correct, power can be connected to the dwelling for the first time.

The final phase corresponds to construction trimming and finishing work. During the trim phase, face plates are mounted over the open-end of the electrical boxes, completing the standard electrical wiring process.

## Summary of the Invention

### Problems with Standard Wiring Construction

There are multiple problems with standard electrical wiring construction. From the electrical contractor perspective, there are unnecessary costs associated with installation. Two separate trips are required for each job site, one for the rough phase and one for the makeup phase. Further, a journeyman electrician is required for each phase. During the makeup phase, installation of the wall panels can damage the work completed during the rough phase. One way in which damage occurs is router contact with exposed cables when drywallers create a hole to accommodate electrical box openings. Another form of damage occurs when drywall compound or paint fouls the exposed cables, insulation and labeling.

From the general contractor perspective, there are other problems with the standard electrical wiring construction. Verification of the electrical contractor's work is not possible until after the makeup phase. Until then, the electrical cables are unterminated. After the makeup phase, however, miswiring typically requires cutouts in the installed wall panels and associated patches after corrections are completed. Further, the electrical system cannot be activated until after verification. Thus, during the rough and makeup phases, electricity for tools and lighting must be supplied by generators, which create hazards due to fumes, fuel, and noise and are an unreliable electrical source. In addition, until the trim phase is completed, unskilled personnel have access to the

electrical cable. Tampering can comprise the integrity of the electrical wiring and also create a safety problem after power is activated.

From a homeowner's perspective, there are problems with repair of the standard electrical wiring. FIG. **1** illustrates a prior art electrical wiring assembly **100**, which includes a standard electrical box **110** and a standard duplex outlet **120**. Replacement of a broken outlet **120** first requires removal of a face plate (not shown). The screws **130** that attach the outlet **120** to the top and bottom of the electrical box **110** must be removed next. The outlet **120** is then removed from the box **110** and the conductors **140** are removed by loosing the screws **150** on the outlet sides. The process is then reversed to attach the conductors **140** to a new outlet **120** and mount the new outlet **120** into the electrical box **110**.

The prior art outlet replacement procedure described above exposes the homeowner to AC wiring upon removal of the face plate. This exposure creates a shock hazard. Further, a homeowner's reluctance to change out broken outlets or to spend the money to hire an electrician also creates a shock and a fire hazard from continued use of cracked, broken or excessively worn outlets. In addition, the integrity of the original wiring becomes questionable if a homeowner or other third party removes and replaces an outlet or switch. Miswiring by a third party can violate building codes and create shock and fire hazards, such as inadvertently switching the hot and neutral conductors, failing to attach ground wires, kinking or nicking conductors and improperly tightening connections.

Benefits of the Present Invention

The safety electrical outlet and switch system according to the present invention, benefits the electrical contractor in several respects. An aspect of the present invention is an electrical box, a wiring panel installed internally to the box and associated outlet and switch modules which snap into and out of the panel without exposure to or access to electrical system wiring attached behind the panel. The journeyman's work is completed at the rough phase, when installation of the wiring panel is complete. Thus, there is no need for the journeyman to return to the job site during the makeup phase because any semi-skilled laborer, following a punch-out code or other indicator on the panel, can snap-

in an appropriate outlet or switch module. Further, there is no wiring access after the rough phase, protecting wiring integrity. Also, there are no exposed conductors or parts inside the electrical box that can be inadvertently damaged during wall panel installation. A protective cover is provided that prevents fouling by drywall compound or other materials during the makeup phase.

The safety electrical outlet and switch system according to the present invention also benefits the general contractor. Because wiring is completed during rough framing, verification and activation of the building electrical system can be performed at the rough phase. Miswiring can be corrected before wall panels are installed and painted, eliminating cut and patch repairs. Early electrical system activation eliminates the need to use generators. Lack of third party access to the journeyman's wiring preserves integrity after verification and eliminates shock exposure to other workers.

The present invention also benefits the homeowner. Replacement of broken sockets and switches can be easily and safely accomplished. Safety is enhanced by reducing exposure to electrical wiring and encouraging replacement of defective outlets and switches. Further, maintenance costs are reduced by reducing the need to hire an electrician for repairs. Wiring integrity is insured by reducing the opportunity of unqualified third parties to access the electrical system.

Aspects Of the Present Invention

One aspect of the current invention is an electrical wiring assembly comprising an electrical box having an open front face and a back face defining a power cable aperture. The assembly also comprises a generally planar wiring panel having a front side and a back side. The wiring panel front side has a panel fixture extending perpendicularly from the front side and a shielded contact surface within the panel fixture. The wiring panel back side has a cable connector. The wiring panel also has a buss electrically connecting the cable connector to the contact surface. The wiring panel is installable within the electrical box so as to define a module compartment in the interior of the electrical box between the wiring panel front side and the box open front face. The assembly also comprises an electrical module having a front cover and a back cover. The module front cover provides a user accessible electrical function. The

module back cover has a module fixture and a shielded spring contact within the module fixture. The module fixture is configured to engage the panel fixture so as to connect the spring contact with the contact surface. The module has an installed position inserted into the electrical box within the module compartment and an uninstalled position removed from the electrical box. The module is removably retained by the panel in the installed position so that power cabling routed through the aperture into the electrical box and connected to the cable connector provides power to the module via the buss, the contact surface and the spring contact.

In one embodiment of the assembly described in the previous paragraph, the assembly further comprises a box mount configured to fixedly attach to a wall stud utilizing a stud alignment guide. The electrical box is attachable to the box mount and movable between a plurality of latchable positions relative to the alignment guide so as to accommodate various wall panel thicknesses. In another embodiment, the wiring panel has a socket providing access to electrical power when power cabling is attached to the cable connector. In that embodiment, the assembly further comprises a protective cover installable over the wiring panel front side and having plug openings so as to allow plug access to the wiring panel socket. In yet another embodiment, the assembly further comprises a face plate having a protruding tab. In that embodiment, the module has a corresponding catch so that the face plate removably snaps onto the module front cover. In another embodiment, the module further comprises an extractor handle having a closed position secured to the electrical box and an open position extending away from the module. In the open position, the handle clasps the module and provides a grip to extract the module from the electrical box. In still another embodiment, the module further comprises a module keyed portion of the back cover. The module keyed portion corresponds to a wiring panel keyed portion of the panel fixture. The module keyed portion and said wiring panel keyed portion insuring the proper orientation of the module in the installed position.

Yet another aspect of the present invention is an electrical wiring assembly comprising an electrical box having an open front face and a back face defining a power cable aperture. The electrical box is configured to be installed with said front face

generally flush with a wall panel exterior surface. The assembly further comprises a wiring panel having a generally planar board. The wiring panel is fastened within the electrical box so as to partition the interior of the electrical box into a user accessible module compartment proximate the front face and a user inaccessible wiring compartment proximate the back face. The wiring panel has a panel fixture within the module compartment and a cable connector within the wiring compartment. The panel fixture provides an electrical connection to the cable connector via a buss portion of the wiring panel. The cable connector is configured to terminate a power cable routed through the aperture into the wiring compartment. The assembly also has a user replaceable module providing a user operable electrical function. The module is installable within the module compartment by snapping the module into the panel fixture. The module is removable from the module compartment by unsnapping the module from the panel fixture. The module is electrically connected to the cable connector when installed within the module compartment.

In one embodiment of the electrical wiring assembly described in the previous paragraph, the panel fixture has a first contact and the module has a corresponding second contact. One of the first and second contacts has a latch and an associated contact surface and the other one of the first and second contacts has a spring contact. The spring contact is retained by the latch and electrically connected to the contact surface when the module is snapped into the panel fixture. In a further embodiment, of the electrical wiring assembly, portions of the panel fixture shield the first contact on all sides so as to minimize user exposure to the first contact when the module is not installed within the module compartment. In yet another embodiment, a socket portion of the wiring panel is configured to accept a standard AC plug inserted into the module compartment when the module is not installed. A corresponding plug contact portion of the wiring panel is located within the wiring compartment. The plug contact is connected to the cable connector via the buss and is configured to accept and electrically connect to a prong portion of the plug. In still another embodiment of the electrical wiring assembly, the module has an extractor handle. The handle has a closed position generally flush with the module and an open position extended from the module so as to

provide a grip. The module is securable to the electrical box with the handle in the closed position and removable from the module compartment with the handle in the open position.

A further aspect of the present invention is a method of wiring an electrical box located within a wall panel to provide electrical service. The electrical box has a back face that receives a power cable and an open front face generally flush with an exterior wall panel surface. The method comprising the step of fastening a generally planar wiring panel within the electrical box so as to partition the interior of the electrical box into a user inaccessible wiring compartment and a user accessible module compartment. The method also comprises the steps of attaching the power cable to a cable connector within the wiring compartment and snapping a module into a panel fixture portion of the wiring panel within the module compartment, the module providing a user operable electrical function. The method further comprises the step of routing a conductive buss portion of the wiring panel between the cable connector and the panel fixture so as to provide electrical power to the module via the power cable.

In one embodiment of the method described in the previous paragraph, the snapping step comprises the substeps of providing a contact surface and an associated latch within the panel fixture, providing a spring contact within a module fixture portion of the module, coupling the module fixture and the panel fixture, and pressing the module against the wiring panel until the spring contact engages the latch and connects with the contact surface. In another embodiment, the method further comprises the steps of placing an extractor handle in a closed position and securing the module to the electrical box utilizing a fastener retained by the handle. Additional steps may include placing an extractor handle in an open position, gripping the extractor handle so as to apply a pulling force on the module directed away from the wiring panel until the spring contact disengages the latch, and removing the module from the module compartment.

Yet another aspect of the present invention is an electrical wiring assembly comprising an electrical box having an open front face and an internal mounting post located at a recess from the front face. The assembly also comprising a wiring panel having a front side and a back side, the wiring panel installed inside the electrical box

with the back side abutting the mounting post. The assembly further comprising a cable connector located on the wiring panel back side configured to connect to a power cable, a prong connector electrically connected to the cable connector, and a socket located on the wiring panel front face and housing the prong connector. The cable connector is configured to connect to a power cable so that power is transmitted to a plug inserted into the socket via the power cable, the cable connector and the prong connector.

One embodiment of the electrical wiring assembly described in the previous paragraph further comprises a protective cover mounted over the wiring panel front side. The protective cover has a plug opening corresponding to the socket so that a plug inserted into the plug opening also is inserted into the socket. In another embodiment, the electrical wiring assembly further comprises a box mount attachable to a wall stud along an alignment guide. The box mount has a first catch at a first distance from the alignment guide and a second catch at a second distance from the alignment guide. The electrical box is mounted to the box mount and is slidable between a first latched position corresponding to the first catch and a second latched position corresponding to the second catch. In yet another embodiment, the recess is at least about 1.25 inches so as to avoid damage to the wiring panel during wall panel installation.

A further aspect of the present invention is a method of wiring an electrical box during the rough framing phase of building construction. The method comprises the step of attaching an electrical box to a wall stud, the electrical box having an open front face and a back face. The method also comprises the step of securing a wiring panel within the electrical box. The wiring panel is located a recessed distance from the front face sufficient to avoid interfering with wall panel installation during the subsequent makeup phase of building construction. The wiring panel has a front side facing the front face and a back side facing the back face. The back face has a cable connector and the front face has a socket configured to accept a standard AC plug. The socket has contacts electrically connected to the cable connector. The method further comprises the steps of routing a power cable through the back face and connecting the power cable to the cable connector and supplying electrical power to the power cable so that electrical service is available via the socket during the makeup phase.

One embodiment of the method described in the previous paragraph further comprises the step of shielding the wiring panel with a protective cover generally conforming to the front face. The protective cover has a plug opening corresponding to the socket and configured to allow a standard AC plug to be inserted through the plug opening and into the socket. In another embodiment, the attaching step comprises the substeps of attaching a box mount to a wall stud so that an alignment guide of the box mount matches a wall stud edge and mounting the electrical box onto the box mount so that the electrical box slides relative to the box mount in a direction generally perpendicular to the wall stud. The attaching step also comprises the substeps of locating a plurality of fixed positions for the electrical box along the box mount and releasably locking the box in one of the positions so as to accommodate the thickness of a wall panel installed on the wall stud. Each of the positions provide a specific distance between the front face and the alignment guide. The method may also comprise the further substep of providing a plurality of position indicators on the box mount. A particular one of the positions is associated with a particular one of the indicators. The particular one of the indicators visibly shows a specific distance from the alignment guide to the box front face for the particular one of the positions.

Another aspect of the present invention is an electrical box assembly comprising a box mount attachable to a wall stud in accordance with a stud alignment guide of the box mount. The assembly also comprises a plurality of catches located along the box mount and an electrical box having a front face. The box is slidably attached to the box mount. A latch portion of the box is configured to releasably engage any of the catches. The box has a plurality of fixed positions corresponding to the catches. Each of the positions places the front face at a specific distance from the alignment guide so that the electrical box can be adjusted for various wall panel thicknesses.

One embodiment of the assembly described in the above paragraph, further comprises a plurality of position indicators located on the electrical box and associated with the positions. Each of the indicators displays a corresponding distance from the alignment guide to the front face. The corresponding distance may be in the range of 0.5 inches to 1.75 inches. In another embodiment, the alignment guide is the leading

edge of the box mount and each of the position indicators aligns with the leading edge to indicate the current distance between the front face and the leading edge. In a further embodiment, the assembly also comprises a side of the electrical box defining a finger aperture. The aperture provides a grip to move the electrical box between the positions. In yet another embodiment, the latch portion has a latch release portion configured to accept a tool to pry the latch from a particular one of the catches.

Yet another aspect of the present invention is a method of installing an electrical box having an open front face. The method comprises the steps of attaching a box mount to a wall stud so that an alignment guide of the box mount matches a wall stud edge and mounting the electrical box onto the box mount so that the electrical box slides relative to the box mount in a direction generally perpendicular to the wall stud. The method comprises the further steps of locating a plurality of fixed positions for the electrical box along said box mount and latching the box in one of the positions so as to accommodate the thickness of a wall panel installed on the wall stud. Each of the positions provides a specific distance between the front face and the alignment guide.

In a particular embodiment of the method described in the previous paragraph, the latching step comprises the substeps of measuring a specific distance from the exterior surface of the wall panel and the proximate edge of the wall stud, releasing a latch portion of the box, sliding the box to a position relative to the box mount where a position indicator corresponding to the specific distance is displayed, and engaging the latch in a corresponding catch slot of the box mount so as to lock the box in a fixed position associated with the position indicator.

Another aspect of the current invention is an electrical wiring assembly comprising an electrical box means for mounting in a wall, a wiring panel means for attaching power cables, a wiring panel means installed within the electrical box means, a module means for providing an electrical function installable within the electrical box means, and a snap-in means for removably attaching and electrically connecting the module means to the wiring panel means. In a particular embodiment, the assembly further comprises a box mount means for attaching the electrical box to a wall stud. In another embodiment, the electrical wiring assembly further comprises a protective cover

means for shielding the wiring panel during the makeup phase of building construction. In yet another embodiment, the electrical wiring assembly further comprises a face plate means for trimming the module when installed within the electrical box.

## Brief Description of the Drawings

FIG. **1** is a perspective view of a prior art outlet electrical wiring assembly;

FIG. **2** is a perspective view of a safety electrical outlet and switch system according to the present invention;

FIGS. **3A-B** are exploded perspective views of an outlet assembly and a switch assembly, respectively, of the safety electrical outlet and switch system, illustrating box mount, electrical box, wiring panel, snap-in electrical modules and face plate portions;

FIGS. **4A-F** are perspective views illustrating the removal and installation of snap-in electrical modules;

FIG. **4A** is a front perspective view of an installed snap-in outlet module;

FIG. **4B** is a front perspective view of an unfastened snap-in outlet module with extended extractor handles;

FIG. **4C** is a front perspective view of an uninstalled snap-in outlet module;

FIG. **4D** is a front perspective view of an uninstalled snap-in switch module;

FIG. **4E** is a front perspective view of an outlet module installed in a wiring panel;

FIG. **4F** is a front perspective view of a switch module installed in a wiring panel;

FIGS. **5A-B** are front and back perspective views, respectively, of a box mount;

FIGS. **6A-B** are front and back perspective views, respectively, of an electrical box;

FIGS. **7A-F** are perspective views of a wiring panel;

FIGS. **7A-B** are front and back perspective views, respectively, of an assembled wiring panel;

FIG. **7C** is a back perspective view of a wiring panel board;

FIG. **7D** is a front perspective view of a wiring panel back cover;

FIGS. **7E-F** are back and front perspective views, respectively, of wiring panel internal conductors;

FIGS. **8A-F** are perspective views of an outlet module;

FIGS. **8A-B** are front and back perspective views, respectively, of an assembled outlet module;

FIG. **8C** is a front perspective view of a mounting bracket;

FIG. **8D** is a back perspective view of an outlet module front cover;

FIG. **8E** is a front perspective view of an outlet module back cover;

FIGS. **8F-G** are back and front perspective views, respectively, of outlet module internal conductors;

FIGS. **9A-F** are perspective views of a switch module;

FIGS. **9A-B** are front and back perspective views, respectively, of an assembled switch module;

FIG. **9C** is a back perspective view of a switch module front cover;

FIG. **9D** is a front perspective view of a switch module back cover;

FIGS. **9E-F** are back and front perspective views, respectively, of switch module internal conductors;

FIGS. **10A-D** are perspective views of snap-on face plates;

FIGS. **10A-B** are front and back perspective views of a flared rectangular face plate;

FIG. **10C** is a front perspective view of a rectangular face plate;

FIG. **10D** is a front perspective view of an oval face plate;

FIGS. **11A-B** are front and back perspective views, respectively, of a protective cover;

FIG. **12** is a front perspective view of a protective cover and a wiring panel illustrating installation of the protective cover over the wiring panel;

FIGS. **13A-C** are front perspective views of a mounted electrical box;

FIG. **13A** is a electrical-box-side front perspective view of a mounted electrical box illustrating the releasable latch inside the box;

FIG. **13B-C** are mounting-bracket-side front perspective views of a mounted electrical box, illustrating the box in first and second positions, respectively, relative to the box mount;

FIGS. **14A-B** are front perspective views of a mounted electrical box and associated components installed on a wall stud;

FIG. **14A** is a perspective view of a mounted electrical box with an installed wiring panel, illustrating box mount alignment;

FIG. **14B** is a perspective view of a mounted electrical box with an installed protective cover illustrating plug accessibility to electrical power during the rough framing phase of construction; and

FIG. **15** is a front perspective view of an adapter wiring panel.

## Detailed Description of the Preferred Embodiments

### System Overview

FIG. **2** illustrates one embodiment of an installed safety electrical outlet and switch system **200** according to the present invention. As shown in FIG. **2**, the outlet and switch system **200** comprises a outlet assembly **310** and a switch assembly **360**. Each of these assemblies **310**, **360** provide a user-accessible electrical function. The outlet assembly **310** is mounted in a wall **210** and functions to supply a user with electrical power through a conventional AC plug inserted into an outlet module **800**. The switch assembly **360** is also mounted in the wall **210** and functions to allow a user to control electrical power to an outlet, a light or any of various electrical devices (not shown) by actuating a switch module **900**. The installed outlet assembly **310** includes a face plate **1000** and an outlet module **800** mounted so that its visible portion is generally flush with the face plate **1000**. The installed switch assembly **360** includes a face plate **1000** and a switch module **900** mounted so that its visible portion is in a plane generally parallel with the face plate **1000**. The face plates **1000** are interchangeable between the outlet assembly **310** and switch assembly **360** and include a flared rectangular face plate, a rectangular face plate and an oval face plate, as described with respect to FIGS. **10A-D**, below. Conveniently, the face plates **1000** attach to or are removed from the outlet assembly **310** or switch assembly **360**

without the need for separate fastening devices , such as screws, and associated tools, as described with respect to FIG. **10B**, below.

FIGS. **3A-B** illustrate embodiments of a safety electrical outlet and switch system, comprising an outlet assembly **310** (FIG. **3A**) and a switch assembly **360** (FIG. **3B**). As shown in FIG. **3A**, an outlet assembly **310** comprises a box mount **500**, an electrical box **600**, a wiring panel **700**, an outlet module **800** and a face plate **1000**. As shown in FIG. **3B**, a switch assembly **360** comprises a box mount **500**, an electrical box **600**, a wiring panel **700**, a switch module **900** and a face plate **1000**. The box mount **500**, electrical box **600**, wiring panel **700**, outlet module **800** (FIG. **3A**), switch module **900** (FIG. **3B**), and face plate **1000** are described in detail below with respect to FIGS. **5A-B**, **6A-B**, **7A-F**, **8A-G**, **9A-F** and **10A-D**, respectively. In one embodiment, the main structural components of the box mount **500**, electrical box **600**, wiring panel **700**, outlet module **800**, switch module **900**, face plate **1000** and protective cover **1100** (FIG. **11**) are composed of thermoplastics, such as nylon, polycarbonate or ABS. In that embodiment, the conductive components of the wiring panel **700**, outlet module **800** and switch module **900** are brass or copper alloys. One of ordinary skill in the art will recognize that other materials can be used for the structural and conductive components of the present invention.

FIGS. **4A-F** illustrate removal and installation of a snap-in outlet module **800** (FIG. **4C**) or a snap-in switch module **900** (FIG. **4D**). FIG. **4A** shows an installed outlet assembly **310** with the face plate **1000** (FIG. **3A**) removed. An outlet module **800** is removably attached to the wiring panel **700** (FIG. **4C**) and secured with fasteners **809** to the electrical box **600**.

FIG. **4B** shows the outlet module **800** during removal from, or installation into, the electrical box **600**. During removal, the fasteners **809** are unfastened to release the outlet module **800** from the electrical box **600** and extend the extractor handles **824**, as shown. The extended extractor handles **824** are manually gripped and pulled to unsnap the outlet module **800** from the wiring panel **700** (FIG. **4C**). The outlet module **800** is then removed from electrical box **600**, as shown in FIG. **4C**. During installation, the process is reversed. The extended extractor handles **824** are pushed into the outlet module **800**, and the outlet

module **800** is secured to the electrical box **600**, as shown in FIG. **4A**, using the fasteners **809** to attach to the module mounting posts **620** (FIG. **4C**)

FIG. **4C** shows an outlet module **800** during installation into or removal from the electrical box **600**. For installation, the outlet module **800** is placed at the electrical box open front face **602**, as shown. The outlet module **800** is then inserted into the module compartment **400** interior to the electrical box **600** between the front face **602** and the wiring panel **700**. The top module fixture **830** and bottom module fixture **840** engage the top panel fixture **710** and bottom panel fixture **720**, respectively. The outlet module **800** is then pressed against the wiring panel **700**, which snaps the outlet module **800** into the wiring panel **700**, electrically connecting the outlet module **800** and wiring panel **700**. The outlet module **800** is then secured to the electrical box **600**, as described above with respect to FIG. **4B**.

FIG. **4D** shows a switch module **900** during installation into or removal from the electrical box **600**. For installation, the switch module **900** is placed at the electrical box front face **602**, as shown. The switch module **900** is then inserted into the module compartment **400** interior to the electrical box **600**. The top module fixture **930** and bottom module fixture **940** engage the top panel fixture **710** and bottom panel fixture **720**, respectively. The switch module **900** is then pressed against the wiring panel **700**, which snaps the switch module **900** into the wiring panel **700**, electrically connecting the switch module **900** and wiring panel **700**. The switch module **900** is then secured to the electrical box **600**, in a manner similar to that described above with respect to FIG. **4B**.

FIG. **4E** shows the outlet module **800** installed into the wiring panel **700**. The outlet module back cover **804** faces the wiring panel front side **702**. The wiring panel top guides **712** fit within the outlet module top slots **834**, and the wiring panel bottom guides **722** fit within the outlet module bottom slots **844**.

FIG. **4F** shows the switch module **900** installed into the wiring panel **700**. The switch module back cover **904** faces the wiring panel front side **702**. The wiring panel top guides **712** fit within the switch module top slots **934**, and the wiring panel bottom guides **722** fit within the switch module bottom slots **944**.

Box Mount

FIGS. **5A-B** show a box mount **500**, which attaches to a framing stud and provides a slidable attachment for the electrical box **600** (FIGS. **6A-B**). As shown in FIG. **5A**, the box mount **500** has a stud plate **510**, fastener holders **520**, mounting brackets **530**, grooves **540**, a latch channel **550** and catch slots **560**. The stud plate **510** has a box side **512**, a stud side **518** (FIG. **5B**), and a leading edge **502** that functions as a stud alignment guide. The fastener holders **520** receive and retain fasteners **522**, such as staples as shown. The box mount **500** is attached to a wall stud with the stud side **518** flush against the stud and with the leading edge **502** aligned with a stud edge. The fasteners **522** are hammered or otherwise driven into the stud through apertures **570** (FIG. **5B**) on the stud side **518** (FIG. **5B**). Attachment of the box mount to a wall stud is described in further detail with respect to FIG. **14A**, below. The electrical box **600** (FIGS. **6A-B**) is attached to the box mount **500** by placing the electrical box **600** (FIGS. **6A-B**) adjacent the area between the mounting brackets **530**, with the latch **650** (FIGS. **6A-B**) adjacent the channel **550**. The slides **630** (FIGS. **6A-B**) are inserted into the mounting brackets **530** and the guides **640** (FIGS. **6A-B**) into the grooves **540**, as described in further detail with respect to FIG. **13A**, below. The catch slots **560** removably retain the electrical box **600** (FIGS. **6A-B**) at various fixed positions, as described in further detail with respect to FIGS. **13B-C**, below.

Electrical Box

FIGS. **6A-B** illustrate an electrical box **600**. The electrical box **600** has outer dimensions generally consistent with conventional electrical boxes. The electrical box **600** has an open front face **602** and a back face **604**. As shown in FIGS. **6A-B**, the electrical box **600** has a mounting side **606** and an opposite gripping side **608**. The mounting side **606** has slides **630**, guides **640**, a latch **650**, position indicators **660**, a finger grip **670** and apertures **680**. The slides **630** and guides **640** mate with corresponding brackets **530** (FIG. **5A**) and grooves **540** (FIG. **5A**) on the box mount **500** (FIGS. **5A-B**), as described with respect to FIG. **13A**, below. The latch **650** has a spring portion **652** and a tab portion **654**. The spring portion **652** is attached to the electrical box **600** along the back face **604** and extends along the mounting side **606**, terminating

with the tab portion **654**. The tab portion **654** extends from the spring portion **652** generally perpendicularly to the mounting side **606**, away from the electrical box **600**. When the electrical box **600** is attached to the box mount **500** (FIGS. **5A-B**), the catch **654** is configured to engage in any of the catch slots **560** (FIGS. **5A-B**). The finger grip **670** is utilized to manually grip and position the electrical box **600** relative to the box mount **500** (FIGS. **5A-B**) according to the position indicators **660**, as described in further detail with respect to FIGS. **13B-C**, below. The apertures **680** are located on the back face **604** for routing power cable through the back face **604** and into the interior of the electrical box **600**. In another embodiment, a center aperture (not shown) is included, also for routing power cable into the interior of the electrical box **600**.

As shown in FIGS. **6A-B**, the front face **602** and interior of the electrical box **600** are configured for installment of the wiring panel **700** (FIGS. **7A-B**), the protective cover **1100** (FIG. **11A-B**), the outlet module **800** (FIGS. **8A-B**) and the switch module **900** (FIGS. **9A-B**). The interior of the electrical box **600** includes panel mounting posts **610** located along each interior corner edge and module mounting posts **620** located along the center of the interior top and bottom faces. Each of the panel mounting posts **610** is recessed from the front face **602** and has a centered hole **612**. In one embodiment, the panel mounting posts **610** are recessed at least about 1.25 inches from the front face **602** to avoid damage to the installed wiring panel **700** (FIGS. **7A-B**) during the makeup phase of construction and, in particular, during wall panel installation. Each of the module mounting posts **620** is flush with the front face **602** and has a centered hole **622**.

The wiring panel **700** (FIGS. **7A-B**) is installed in the interior of the electrical box **600** with panel back side **704** (FIG. **7B**) abutting the panel mounting posts **340**. The wiring panel **700** (FIGS. **7A-B**) is secured within the electrical box **600** with fasteners **707** (FIG. **7C**) threaded or otherwise inserted into the centered holes **612**, as described with respect to FIG. **14A**, below. Similarly, the protective cover **1100** (FIGS. **11A-B**) is installed in the interior of the electrical box **600** against the panel mounting posts **340** and secured with fasteners **707** (FIG. **12**) inserted through the centered holes **612**, as described with respect to FIG. **14B**, below. The outlet module **800** (FIGS. **8A-**

**B**) and the switch module **900** (FIGS. **9A-B**) are snapped into the wiring panel **700** (FIGS. **7A-D**) and secured to the module mounting posts **620** with the fasteners **809** (FIG. **4A-D**) threaded or otherwise inserted into centered holes **622**, as described with respect to FIGS. **4A-D**, above.

Wiring Panel

FIGS. **7A-F** illustrate the generally planar wiring panel **700**, which has a board **701**, internal conductors **703**, a back cover **705** and fasteners **707**. The board **701** (FIG. **7C**) retains the internal conductors **703** (FIGS. **7E-F**), the back cover **705** (FIG. **7D**) and the fasteners **707** (FIG. **7C**) of the assembled wiring panel **700** (FIGS. **7A-B**). FIGS. **7A-B** illustrate the assembled wiring panel **700**.

As shown in FIGS. **7A-B**, the wiring panel **700** has a front side **702** and a back side **704**. As shown in FIG. **7A**, the front side **702** has a top panel fixture **710**, a bottom panel fixture **720** and an socket **730**. The top panel fixture **710** and bottom panel fixture **720** are configured to accept, removably retain and electrically connect to an outlet module **800** (FIGS. **8A-B**), a switch module **900** (FIGS. **9A-B**) or similar module that provides a user-accessible electrical function. The top panel fixture **710** has top guides **712**, top latches **714**, top panel contacts **756**, **766** and a ground connector **718**, all extending in a direction normal to the front side **702**. A ground panel contact **776** (FIG. **7F**) is accessible through the ground connector **718**. The bottom panel fixture **720** has bottom guides **722**, bottom latches **724** and bottom panel contacts **757**, **767**, also all extending in a direction normal to the front side **702**.

Also shown in FIG. **7A**, the socket **730** has a hot slot **732**, a neutral slot **734** and a ground hole **736**. The socket **730** is configured to accept and electrically connect to a standard plug, which is inserted into the socket **730** so that the plug's hot prong, neutral prong and ground post enters the hot slot **732**, neutral slot **734** and ground hole **736**, respectively, and electrically connects with the hot socket contact **758** (FIGS. **7E-F**), neutral socket contact **768** (FIGS. **7E-F**) and ground socket contact **778** (FIGS. **7E-F**), respectively.

One particularly advantageous feature of the wiring panel **700** is the socket **730**. The socket **730** allows power to be supplied to a construction crew after the wiring

panel **700** has been wired and building electrical system tested and activated, prior to the makeup phase, as described in further detail with respect to FIGS. **14A-B**, below. Another particularly advantageous feature is that a user's exposure to the top panel contacts **756, 766** is minimized by the top guides **712**, top latches **714** and ground connector **718** that shield the top panel contacts **756, 766** on all four sides and the front. Further, the ground connector **718** separates the first top panel contact **756** from the second top panel contact **766**, reducing the possibility of a short between the top panel contacts **756, 766**. Similarly, the bottom guides **722** and bottom latches **724** shield the bottom panel contacts **757, 767** from the sides and the front.

As shown in FIG. **7B**, the wiring panel back side **704** has a back cover **705**, first buss cable connectors **752, 754**, second buss cable connectors **762, 764** and a ground buss cable connector **772**. A first buss breakaway **755** can be removed during wiring of the wiring panel **700** in order to isolate the first buss top cable connector **752** from the first buss bottom cable connector **754**. Similarly, a second buss breakaway **755** can be removed in order to isolate the second buss top cable connector **762** from the second buss bottom cable connector **764**. During installation of the wiring panel **700** into the electrical box **600** (FIG. **6A-B**), described with respect to FIG. **14A**, below, one or more electrical cables, such as power or equivalent, are routed through the electrical box apertures **680** and the wires within the cables are attached to the cable connectors **752, 754, 762, 764**. The wire connections are made by hooking an uninsulated conductor portion of the wires around the respective screws of the cable connectors **752, 754, 762, 764** and tightening the screws so that the conductors are secured between the screws and their respective busses **750, 760, 770** (FIGS. **7E-F**), as is well-known in the art. The particular wiring configuration is a function of a master wiring plan for the building under construction and the module type to be installed in the wiring panel **700**. Several wiring panel **700** wiring configurations are described below.

FIG. **7C** illustrates the back side **704** of the wiring panel board **701**, which has mounting post slots **706**, mounting holes **708** and grips **709**. These features are used to install the wiring panel **700** and secure it with fasteners **707** within the electrical box **600** (FIGS. **6A-B**), as described with respect to FIG. **14A**, below. The wiring panel board **701**

also has raised chambers **782, 784, 786** that retain the internal conductors **703** (FIGS. **7E-F**) and binding sockets **781**.

FIG. **7D** illustrates the front of the wiring panel back cover **705**. The back cover **705** has a connector aperture **792** that accommodates the ground buss cable connector **772** (FIG. **7B**), prong apertures **794, 796** that accommodate the prongs of a standard plug inserted into the wiring panel socket **730** (FIG. **7A**), and a ground post aperture **798** that accommodates the ground post of the inserted standard plug. Binding posts **791** press-fit into corresponding binding sockets **781** (FIG. **7C**) on the panel back side **704** (FIG. **7C**) for joining the back cover **705** to the wiring panel board **701** (FIG. **7C**).

As shown in FIGS. **7E-F**, the internal conductors **703** include a first buss **750**, a second buss **760** and a ground buss **770**. The busses **750, 760, 770** are retained within the wiring panel board raised chambers **782, 784, 786**, respectively. The first buss **750** electrically connects the first top panel contact **756**, the first buss top cable connector **752**, the first buss breakaway **755**, the first bottom panel contact **757**, the first buss bottom cable connector **754** and the hot socket contact **758**. Similarly, the second buss **760** electrically connects the second top panel contact **766**, the second buss top cable connector **762**, the second buss breakaway **765**, the second bottom panel contact **767**, the second buss bottom cable connector **764** and the neutral socket contact **768**. The ground buss **770** electrically connects the ground panel contact **776**, the ground buss cable connector **772** and the socket ground contact **778**. If the first buss breakaway **755** is removed, the first top panel contact **756** and the first buss top cable connector **752** are electrically isolated from the first bottom panel contact **757**, the first buss bottom cable connector **754** and the hot socket contact **758**. Likewise, if the second buss breakaway **765** is removed, the second top panel contact **766** and the second buss top cable connector **762** are electrically isolated from the second bottom panel contact **767**, the second buss bottom cable connector **764** and the neutral socket contact **768**. The panel contacts **756, 766, 757, 767** provide contact surfaces for electrical connection to outlet module contacts **856, 866, 857, 867** or switch module contacts **956, 966, 957, 967** as described with respect to FIGS. **8F-G** and FIGS. **9E-F**, below.

Outlet Module

FIGS. **8A-G** illustrate an outlet module **800**, which has a front cover **802**, an attachment assembly **820**, a back cover **804** and internal conductors **806**. FIGS. **8A-B** illustrate an assembled outlet module **800**, FIG. **8C** illustrates the front of the attachment assembly **820**, FIG. **8D** illustrates the back of the outlet module front cover **802**, FIG. **8E** illustrates the front of the outlet module back cover **804**, and FIGS. **8F-G** illustrate the outlet module internal conductors **806**. As shown in FIG. **8A**, the front cover **802** and back cover **804** are glued, welded or otherwise attached together to form the body of the outlet module **800**. The attachment assembly **820** is retained by the front cover **802**, as described with respect to FIG. **8C**, below, and provides the means to secure the outlet module **800** to an electrical box **600** (FIGS. **6A-B**). The front cover **802** has a raised socket portion **810**, which includes a top socket **811** and a bottom socket **816**, each compatible with a standard AC plug. The top socket **811** has a hot slot **812**, a neutral slot **813** and a ground post hole **814**, which provide plug access to the top socket contacts **854**, **864**, **874** (FIGS. **8F-G**). Similarly, the bottom socket **816** has a hot slot **817**, a neutral slot **818** and a ground post hole **819**, which provide plug access to the bottom socket contacts **855**, **865**, **875** (FIGS. **8F-G**).

As shown in FIG. **8B**, the back cover **804** includes a top module fixture **830** and a bottom module fixture **840**. The top module fixture **830** includes top contact housings **832** and top slots **834**. The bottom module fixture **840** includes bottom contact housings **842**, bottom slots **844**, and a module key **846**. The top contact housings **832** contain top outlet contacts **856**, **866**, and the bottom contact housings **842** contain bottom outlet contacts **857**, **867**. A ground bar **876** extends from the back cover **804** between the top contact housings **832**.

As shown in FIG. **8C**, the attachment assembly **820** includes a bracket **822** and extractor handles **824**. The bracket **822** is a one-piece conductive element that fits around the outside of the front cover **802**. The sides of the front cover **802** (FIG. **8D**) include protruding cover catches **803** (FIG. **8D**) that extend through bracket slots **823** to retain the attachment assembly **820** and to retain a cover plate **1000** (FIGS. **10A-D**), as described with respect to FIG. **10B**, below. The extractor handles **824** are moveably

retained by the bracket **822**, and each handle **824** has a crossbar **826** and arms **828**. At the tip of each handle arm **828** is a clasp **829**. In the center of each handle crossbar **826** is a fastener hole **827**. A fastener **809**, such as a screw or equivalent, is moveably retained within the fastener hole **827**. The extractor handles **824** each have a closed position, shown at the top of FIG. **8C**, and an open position, shown at the bottom of FIG. **8C**. In the closed position, the handles **824** are pushed in so that the crossbar **826** fits against the bracket **822**. In the open position, the handles **824** are pulled out so that they extend away from the bracket **822**, with the arm clasps **829** each clasping an edge portion of the bracket **822**. With the handles **824** in the closed position, the outlet module can be secured to an electrical box **600** (FIGS. **6A-B**), as described with respect to FIG. **4A**, above. With the handles **824** in the open position, the outlet module can be removed from a wiring panel **700** (FIGS. **7A-B**), as described with respect to FIGS. **4B-C**, above.

As shown in FIG. **8D**, the front cover **802** has binding posts **883** that press-fit into corresponding binding sockets **893** (FIG. **8E**) on the back cover **804** (FIG. **8E**) for joining the front cover **802** and back cover **804** (FIG. **8E**). The front cover **802** also has a raised portion **881** that retains the ground buss **870** (FIGS. **8F-G**) and the adjacent top and bottom busses **851**, **852**, **861**, **862** (FIGS. **8F-G**).

As shown in FIG. **8E**, the back cover **804** has top recessed portions **891** within the top contact housings **832** that retain the top outlet contacts **856**, **866** (FIGS. **8F-G**). Similarly, the back cover **804** has bottom recessed portions **892** within the bottom contact housings **842** that retain the bottom outlet contacts **857**, **867** (FIGS. **8F-G**).

As shown in FIGS. **8F-G**, the internal conductors **806** of the outlet module **800** include a top hot buss **851**, a bottom hot buss **852**, a top neutral buss **861**, a bottom neutral buss **862**, and a ground buss **870**. The top hot buss **851** has a top socket hot contact **854** and a top hot module contact **856**. The bottom hot buss **852** has a bottom socket hot contact **855** and a bottom hot module contact **857**. The top neutral buss **861** has a top socket neutral contact **864** and a top neutral module contact **866**. The bottom neutral buss **862** has a bottom socket neutral contact **865** and a bottom neutral module

contact **867**. The ground buss **870** has a ground bar **876**, a top socket ground contact **874** and a bottom socket ground contact **875**.

Outlet Module Installation

In reference to FIG. **8B**, an outlet module **800** is installed in an electrical box **600** (FIGS. **6A-B**) as described with respect to FIGS. **4A-C, E** above. An outlet module **800** and the wiring panel **700** (FIGS. **7A-B**) are keyed to prevent the installation of an outlet module **800** into a module compartment **400** (FIG. **4C**) with an incorrect, i.e. upside-down orientation. Specifically, the module key **846** must engage the bottom panel fixture **720** (FIG. **7A**) and the ground bar **876** must engage the ground connector **718** (FIG. **7A**) for proper module orientation. The module key **846** will not engage the top panel fixture **710** (FIG. **7A**) and the ground bar **876** will not engage the bottom panel fixture **720** (FIG. **7A**) in the improper orientation. That is, the module key **846** and ground bar **876** function as keyed structures of the outlet module **800**, and the ground connector **718** (FIG. **7A**) and bottom panel fixture **720** (FIG. **7A**), in particular the gap between the guides and latches **722, 724** (FIG. **7A**), function as keyed structures of the wiring panel **700** (FIG. **7A**). The keyed structures of the outlet module **800** and the corresponding keyed structures of the wiring panel **700** (FIG. **7A**) insure proper orientation of the installed outlet module **800**.

In reference to FIGS. **8F-G**, when an outlet module **800** (FIGS. **8A-B**) is attached to a wiring panel **700** (FIGS. **7A-B**), the top hot module contact **856** is electrically connected to the first top panel contact **756** (FIGS. **7E-F**), the top neutral module contact **866** is electrically connected to the second top panel contact **766** (FIGS. **7E-F**), the bottom hot module contact **857** is electrically connected to the first bottom panel contact **757** (FIG. **7E-F**), and the bottom neutral module contact **867** is electrically connected to the second bottom panel contact **767** (FIG. **7E-F**). In this configuration, if the wiring panel **700** (FIGS. **7A-B**) is wired in a full-hot configuration, as described below, then the top **851** and bottom **852** hot busses are hot, the top **861** and bottom **862** neutral busses are neutral and the ground buss **870** is grounded. In this manner, the top socket contacts **854, 864, 874** provide power to a standard AC plug inserted into the top socket **811** (FIG. **8A**) and the bottom socket contacts **855, 865, 875**

provide power to a standard AC plug inserted into the bottom socket **816** (FIG. **8A**). Similarly, if the wiring panel **700** (FIGS. **7A-B**) is wired in a half-hot configuration, as described below, then a standard AC plug inserted into (typically) the bottom socket **816** (FIG. **8A**) is provided power and a standard plug inserted into (typically) the top socket **811** (FIG. **8A**) is provided switched power.

Also in reference to FIGS. **8F-G**, the outlet module contacts **856, 857, 866, 867** are spring contacts each extending from busses **851, 852, 861, 862** and each having a generally V-shaped contact point. During installation, as the outlet module **800** (FIGS. **8A-B**) is pressed against the wiring panel **700** (FIGS. **7A-B**) the top and bottom module contacts **856, 857, 866, 867** press against the corresponding top latches **714** (FIG. **7A**) and bottom latches **724** (FIG. **7A**). These latches **714, 724** (FIG. **7A**) are flexible, spring-like structures extending from the wiring panel board **701** (FIG. **7A**) and having a hooked tip. When sufficient pressing force is applied, the spring contacts **856, 857, 866, 867** and the spring latches **714, 724** (FIG. **7A**) flex until the contact points pass over and clear the hooked tips and connect with the contact surfaces of the panel contacts **756, 757, 766, 767** (FIG. **7A**), with the hooked tip latches 714, 724 retaining the V-shaped module contacts **856, 857, 866, 867**. At the instant the contact points pass over the latch tips, the contacts **856, 857, 866, 867** and latches **714, 724** (FIG. **7A**) quickly return to their unflexed positions with a mechanical action that is referred to herein as a snap, snapping or snap-in. A similar mechanical action occurs when the contacts **856, 857, 866, 867** and latches **714, 724** (FIG. **7A**) are disconnected and is referred to herein as an unsnap, unsnapping or snap-out.

The snapping and unsnapping of the outlet module during installation and removal creates positive tactile feedback that both a mechanical and electrical connection has been made between the outlet module **800** (FIGS. **8A-B**) and the wiring panel **700** (FIGS. **7A-B**). This is in contrast to a plug-in electrical connection, such as when the prongs of a standard AC plug are inserted into or removed from a standard socket, where the tactile feedback is that of slight, continual resistance to the movement of the plug rather than the build-up and quick release of resistance for the snap-in module installation into the module compartment **400** (FIG. **4C**) and attached to the

wiring panel **700** (FIGS. **7A-B**) or the corresponding snap-out module removal according to the present invention.

Wiring Panel Outlet Module Wiring

In reference to FIG. **7B**, the wiring panel **700** is wired for a full-hot duplex outlet by connecting the black, white and green wires of a single power cable to, for example, the first buss bottom cable connector **754**, the second buss bottom cable connector **764**, and ground buss cable connector **772**, respectively. In this manner, both of the duplex sockets **811**, **816** (FIG. **8A**) of an installed outlet module **800** (FIG. **8A-B**) are always hot.

Also in reference to FIG. **7B**, the wiring panel **700** is wired for a half-hot duplex outlet by connecting the black and white wires of one power cable as described above. The black and white wires of a second power cable are connected to the top hot **752** and neutral **762** connectors, respectively. Break away portions **755**, **765** of the hot buss **750** and neutral buss **760**, respectively, are removed, isolating the top hot connector **752** from the bottom hot connector **754** and the top neutral connector **762** from the bottom neutral connector **764**. This also isolates the top panel contacts **756**, **766** (FIG. **7A**) from the bottom panel contacts **757**, **767** (FIG. **7A**). In this manner, one of the duplex sockets **816** (FIG. **8A**) of an installed outlet module **800** is always hot and the other duplex socket **811** (FIG. **8A**) is on or off, as controlled by a nearby switch that routes power to the second power cable.

Switch Module

FIGS. **9A-F** illustrate a switch module **900**, which has a front cover **902**, a rocker switch **910**, an attachment assembly **820**, a back cover **904** and internal conductors **906**. FIGS. **9A-B** illustrate an assembled switch module **900**, FIG. **9C** illustrates the back of a switch module front cover **902**, FIG. **9D** illustrates the front of a switch module back cover **904**, and FIGS. **9E-F** illustrate the switch module internal conductors **906**. As shown in FIG. **9A**, the front cover **902** and back cover **904** are glued, welded or otherwise attached together to form the body of the switch module **900**. The attachment assembly **820** is retained by the front cover **802**, as described with respect to FIG. **8C**, above, and provides the means to secure the switch module **900** to an electrical box **600**

(FIGS. **6A-B**). The front cover **902** incorporates a rocker switch **910**, which has an upper portion **912** with a raised button **913** and a lower portion **914** with an indented button **915**. The rocker switch **910** has a first position with the upper portion **912** proximate the front cover **902**, as shown, and a second position with the lower portion **914** proximate the front cover **902**.

As shown in FIG. **9B**, the back cover **904** includes a top module fixture **930** and a bottom module fixture **940**. The top module fixture **930** includes top contact housings **932** and top slots **934**. The bottom module fixture **940** includes bottom contact housings **942**, bottom slots **944**, and a wiring panel key **946**. The top contact housings **932** contain top module contacts **956**, **966**, and the bottom contact housings **842** contain bottom module contacts **957**, **967**. A ground bar **976** extends from the back cover **904** between the top contact housings **932**.

As shown in FIG. **9C**, the front cover **902** has a binding post **984** that press-fits into a corresponding binding socket **994** (FIG. **9D**) on the back cover **904** (FIG. **9D**) and binding sockets **983** that accept back cover binding posts **993**, all for joining the front cover **902** and back cover **904** (FIG. **9D**). The front cover **902** also has a switch aperture **981** through which protrudes a lever portion **918** of the rocker switch **910**. The sides of the front cover **902** include protruding cover catches **903** that extend through bracket slots **823** (FIG. **8C**) to retain the attachment assembly **820** (FIGS. **9A-B**) and to retain a cover plate **1000** (FIGS. **10A-D**), in a manner similar to that described with respect to FIG. **8C**, above.

As shown in FIG. **9D**, the back cover **904** has top recessed portions **991** within the top contact housings **932** that retain the top module contacts **956**, **966** (FIGS. **9E-F**). Similarly, the back cover **904** has bottom recessed portions **992** within the bottom contact housings **942** that retain the bottom module contacts **957**, **967** (FIGS. **9E-F**). The back cover **904** also has carrier supports **998** for the carrier **960** (FIGS. **9E-F**), a buss support **997** for the second bottom buss **962** (FIGS. **9E-F**), a support **996** for the top upper throw contact **967** (FIGS. **9E-F**), as well as other raised structures (not shown) for supporting the first bottom buss **952** (FIGS. **9E-F**) and the first top buss **951** (FIGS. **9E-F**). A spring aperture **999** retains the slide spring **925** (FIG. **9E**).

As shown in FIGS. **9E-F**, the switch module internal conductors **906** include a first top buss **951**, a second top buss **961**, a first bottom buss **952** and a second bottom buss **962**. The first top buss **951** electrically connects the first top module contact **956** and the top pole **954**. The first bottom buss **952** electrically connects the first bottom module contact **957** and the bottom pole **955**. The second top buss **961** electrically connects the second top module contact **966** and the carrier **960**. The carrier **960** has a top lower throw contact **964** and a bottom upper throw contact **968**. The second bottom buss **962** electrically connects the second bottom module contact **967** and the bottom lower throw contact **965**. A center buss **963** electrically connects the top upper throw contact **967** and the bottom lower throw contact **965**.

Also shown in FIGS. **9E-F**, a slide **920** has a switch lever aperture **921**, top stops **926** and bottom stops **927**. The rocker switch lever **918** (FIG. **9C**) fits into the lever aperture **921**. The spring **925** provides resistance to movement of the slide **920** and a corresponding tactile tension to the rocker switch **910** (FIG. **9A**). When the rocker switch **910** (FIG. **9A**) is in its first position (as shown in FIG. **9A**, the lever **918** (FIG. **9C**) is in its down position (as shown in FIG. **9C**), which moves the slide **920** in its down position. When the rocker switch **910** (FIG. **9A**) is in its second position, the lever **918** (FIG. **9C**) is in its up position, which moves the slide **920** to its up position (as shown in FIGS. **9E-F**). In the slide upper position, the lower portions of the stops **926**, **927** move the poles **954**, **955** so as to connect with the upper throw contacts **967**, **968**. In the slide lower position, the upper portions of the stops **926**, **927** move the poles **954**, **955** so as to connect with the lower throw contacts **964**, **965**.

Switch Module Installation

In reference to FIG. **9B**, a switch module **900** is installed in an electrical box **600** (FIGS. **6A-B**) as described with respect to FIGS. **4D** and **F**, above. A switch module **900** and the wiring panel **700** (FIGS. **7A-B**) are keyed to prevent the installation of a switch module **900** into a module compartment **400** (FIG. **4D**) with an incorrect, i.e. upside-down orientation. Specifically, the module key **946** must engage the bottom panel fixture **720** (FIG. **7A**) and the ground bar **976** must engage the ground connector **718** (FIG. **7A**) for proper module orientation. The module key **946** will not engage the

top panel fixture **710** (FIG. **7A**) and the ground bar **976** will not engage the bottom panel fixture **720** (FIG. **7A**) in the improper orientation. That is, the module key **946** and ground bar **976** function as keyed structures of the switch module **900**, and the ground connector **718** (FIG. **7A**) and bottom panel fixture **720** (FIG. **7A**), function as keyed structures of the wiring panel **700** (FIG. **7A**), as described with respect to the outlet module **800** (FIGS. **8A-B**), above. The keyed structures of the switch module **900** and the corresponding keyed structures of the wiring panel **700** (FIG. **7A**) insure proper orientation of the installed switch module **900**.

In reference to FIGS. **9E-F**, when a switch module **900** (FIGS. **9A-B**) is attached to a wiring panel **700** (FIGS. **7A-B**), the first top module contact **956** is electrically connected to the first top panel contact **756** (FIGS. **7E-F**), the second top module contact **966** is electrically connected to the second top panel contact **766** (FIGS. **7E-F**), the first bottom module contact **957** is electrically connected to the first bottom panel contact **757** (FIG. **7E-F**), and the second bottom module contact **967** is electrically connected to the second bottom panel contact **767** (FIG. **7E-F**).

Also in reference to FIGS. **9E-F**, the switch module contacts **956, 957, 966, 967** are spring contacts and each having a generally V-shaped contact point. During installation, as the switch module **800** (FIGS. **8A-B**) is pressed against the wiring panel **700** (FIGS. **7A-B**) the top and bottom module contacts **956, 957, 966, 967** press against the corresponding top latches **714** (FIG. **7A**) and bottom latches **724** (FIG. **7A**) and eventually snap together, in a manner similar to that described with respect to the outlet module 800 (FIGS. 8A-B), above. The snapping and unsnapping of the switch module during installation and removal creates positive tactile feedback that both a mechanical and electrical connection has been made between the switch module **900** (FIGS. **9A-B**) and the wiring panel **700** (FIGS. **7A-B**) within the module compartment **400** (FIG. **4D**).

Switch Module Configurations And Associated Wiring Panel Wiring

SPST Switch

As shown in FIGS. **9E-F**, the internal conductors **906** can be configured as a SPST (single-pole, single-throw) switch, a DPST (double-pole, single-throw) switch, a three-way switch, and a four-way switch. If the top upper throw contact **967**, the lower

throw contact **964** and the bottom upper throw contact **968** are removed, the lower pole **955** and bottom lower throw contact **965** form a SPST switch. When the rocker switch **910** (FIG. **9A**) is moved to its first position, causing the slide **920** to move to its lower position, the pole **955** connects with the bottom lower throw contact **965**, electrically connecting the first bottom module contact **957** with the second bottom module contact **967**. Likewise, when the rocker switch **910** (FIG. **9A**) is moved to its second position, causing the slide **920** to move to its upper position, the pole **955** disconnects from the bottom lower throw contact **965**, electrically disconnecting the first bottom module contact **957** with the second bottom module contact **967**. Thus, movement of the rocker switch **910** (FIG. **9A**) between its first and second positions alternately makes and breaks an electrical connection between the bottom module contacts **957**, **967**.

In reference to FIG. **7B**, the wiring panel **700** is wired for a SPST switch, as described above, by connecting the black (hot) wire of a first power cable to the first buss bottom cable connector **754** and the black wire of a second power cable to the second buss bottom cable connector **764**. In this manner, when the first bottom module contact **757** is switched to the second bottom module contact **767** via an installed SPST switch module **900** (FIG. **9A-B**), as described with respect to FIGS. **9E-F**, above, power is switched between the first and second power cables.

DPST Switch

As shown in FIGS. **9E-F**, if the top upper throw contact **967** and the bottom upper throw contact **968** are removed, the upper pole **954** in conjunction with the top lower throw contact **964** and the lower pole **955** in conjunction with the bottom lower throw contact **965** form a DPST switch. When the rocker switch **910** (FIG. **9A**) is moved to its first position, causing the slide **920** to move to its lower position, the poles **954**, **955** connect with the corresponding lower throw contacts **964**, **965** electrically connecting the top module contacts **956**, **966** and, also, electrically connecting the bottom module contacts **957**, **967**. Likewise, when the rocker switch **910** (FIG. **9A**) is moved to its second position, causing the slide **920** to move to its upper position, the poles **954**, **955** disconnect with the corresponding lower throw contacts **964**, **965** electrically disconnecting the top module contacts **956**, **966** and, also, electrically

disconnecting the bottom module contacts **957, 967**. Thus, movement of the rocker switch **910** (FIG. **9A**) between its first and second positions alternately makes and breaks an electrical connection between the top module contacts **956, 966** and, also, alternately makes and breaks an electrical connection between the bottom module contacts **957, 967**.

In reference to FIG. **7B**, the wiring panel **700** is wired for a DPST switch, as described above, by removing the first **755** and second **765** buss breakaways to isolate the top panel contacts **756, 766** (FIGS. **7E-F**) from the bottom panel contacts **757, 767** (FIGS. **7E-F**) and, hence, isolating the top module contacts **956, 966** (FIGS. **9E-F**) from the bottom module contacts **957, 967** (FIGS. **9E-F**) of an installed DPST switch module. The black and white wires of a first power cable are connected to the first buss bottom **754** and top **752** cable connectors, respectively. The black and white wires of a second power cable are connected to the second buss bottom **764** and top **762** cable connectors, respectively. In this manner, when the first top panel contact **756** is switched to the second top panel contact **766** and the first bottom panel contact **757** is switched to the second bottom panel contact **767** via an installed DPST switch module **900** (FIG. **9A-B**), as described with respect to FIGS. **9E-F**, above, an electrical load can be switched between the first and second power cables.

Three-Way Switch

As shown in FIGS. **9E-F**, if the top upper throw contact **967** is removed, the upper pole **954** in conjunction with the top lower throw contact **964** and the lower pole **955** in conjunction with the bottom lower and upper throw contacts **965, 968** form a three-way switch. When the rocker switch **910** (FIG. **9A**) is moved to its first position, causing the slide **920** to move to its lower position, the poles **954, 955** connect with the corresponding lower throw contacts **964, 965** electrically connecting the top module contacts **956, 966** and, also, electrically connecting the bottom module contacts **957, 967**. When the rocker switch **910** (FIG. **9A**) is moved to its second position, causing the slide **920** to move to its upper position, the top pole **954** is disconnected. The bottom pole **955**, however, is connected with the bottom upper throw contact **968**, which is connected to the second top module contact **966** via the carrier **960** and the second top

buss **961**. Thus, movement of the rocker switch **910** (FIG. **9A**) between its first and second positions alternately makes and breaks an electrical connection between the bottom module contacts **957**, **967** and, also, electrically connects the second top module contact **966**, alternately, with the first top module contact **956** and the first bottom module contact **957**.

Four-Way Switch

As shown in FIGS. **9E-F**, if all of the conductors **906** are in place, the upper pole **954** in conjunction with the top lower and upper throw contacts **964**, **967** and the lower pole **955** in conjunction with the bottom lower and upper throw contacts **965**, **968** form a four-way switch. When the rocker switch **910** (FIG. **9A**) is moved to its first position, causing the slide **920** to move to its lower position, the poles **954**, **955** connect with the corresponding lower throw contacts **964**, **965** electrically connecting the top module contacts **956**, **966** and, also, electrically connecting the bottom module contacts **957**, **967**. When the rocker switch **910** (FIG. **9A**) is moved to its second position, causing the slide **920** to move to its upper position, the poles **954**, **955** connect with the corresponding upper throw contacts **967**, **968**, electrically connecting the top first module contact **956** with the bottom second module contact **967** via the center buss **963** and, also, electrically connecting the bottom first module contact **957** with the top second module contact **966** via the carrier **960** and the second top buss **961**. Thus, movement of the rocker switch **910** (FIG. **9A**) between its first and second positions makes an electrical connection between the bottom module contacts **957**, **967** and, also, between the top module contacts **956**, **966**, and, alternately, makes an electrical connection between the first top module contact **956** and the second bottom module contact **967** and, also, between the first bottom module contact **957** and the second top module contact **966**.

The outlet module **800** (FIGS. **8A-B**) and switch module **900** (FIGS. **9A-B**) are described above as having top and bottom contacts at the back side of the back covers **804** (FIG. **8B**), **904** (FIG. **9B**), with corresponding contact placement on the wiring panel front side **702** (FIGS. **7A-B**). Other contact placements are contemplated as being within the scope of the present invention. For example, one of ordinary skill in the art

will recognize that side contacts along the back side of the back covers or contacts along the edges or sides of the module covers also would be feasible. Further, the modules **800** (FIGS. **8A-B**), **900** (FIGS. **9A-B**) are described above as having spring contacts, with corresponding latches and contact surfaces located on the wiring panel **700** (FIGS. **7A-B**). Other contact types and combinations are contemplated as being within the scope of the present invention. For example, contact surfaces and latches mounted in the modules **800** (FIGS. **8A-B**), **900** (FIGS. **9A-B**), with corresponding spring contacts mounted in the wiring panel **700** (FIGS. **7A-B**) are also feasible.

Face Plates

FIGS. **10A-D** illustrate a face plate **1000**, which provides the wall trim for an installed electrical outlet **310** or switch **360**, as described with respect to FIG. **2**, above. As shown in FIGS. **10A-B**, one embodiment of a face plate **1000** has a flared-rectangular-shaped cover plate **1010** and a cover aperture **1020**. In another embodiment, the face plate **1000** has a rectangular-shaped cover plate **1080** (FIG. **10C**). In yet another embodiment, the face plate **1000** has an oval-shaped cover plate **1090** (FIG. **10D**). The cover plate **1010** has a front side **1012**, which is the visible trim when installed, and a back side **1014**, which is not visible when installed flush against a wall. The cover aperture **1020** has straight edges and semi-circular ends and fits over the similarly shaped raised portion **810** (FIG. **8A**) of an outlet module **800** (FIGS. **8A-B**) or the similarly shaped rocker switch **910** (FIG. **9A**) of a switch module **900** (FIGS. **9A-B**).

As shown in FIG. **10B**, the face plate **1000** is installed onto and removed from an installed module **800** (FIGS. **8A-B**), **900** (FIGS. **9A-B**) without the use of separate fasteners, such as conventional screws. The plate back side **1014** has protruding tabs **1030**, each with an indented portion **1032** that latch onto an outlet module catch **803** (FIG. **8D**) or switch module catch **903** (FIG. **9C**). The tabs **1030** releasably retain the face plate **1000** when pressed onto an installed outlet module **800** (FIGS. **8A-B**) or switch module **900** (FIGS. **9A-B**). In this manner, the face plate **1000** covers the wall-mounted electrical box **600** (FIGS. **6A-B**) and the modules installed therein.

Protective Cover

FIGS. **11A-B** illustrate a protective cover **1100**, which protects the interior of the electrical box **600** (FIGS. **6A-B**), the wiring panel **700** (FIGS. **7A-B**), and the associated power cables installed within the electrical box **600** (FIGS. **6A-B**) during the makeup phase, as described with respect to FIG. **14B**, below. The protective cover **1100** has a shield plate **1110**, a top sleeve **1120** and a bottom sleeve **1130**. The shield plate **1110** is generally planar and dimensioned to closely conform to the interior of the electrical box **600** (FIG. **6A**) and the wiring panel front side **702** (FIG. **7A**). The top sleeve **1120** extends perpendicularly from the shield plate **1110** so that the top sleeve inside **1122** fits over the top panel fixture **710**. The bottom sleeve **1130** also extends perpendicularly from the shield plate **1110** so that the bottom sleeve inside **1132** fits over the bottom panel fixture **720**. The shield plate has post slots **1140**, cutouts **1150**, mounting holes **1160**, and a plug opening **1170**. The post slots **1140** allow the protective cover **1100** to slide over the module mounting posts **622** (FIG. **6B**) during installation in the electrical box **600** (FIGS. **6A-B**). The cutouts **1150** and the mounting holes **1160** work in conjunction to allow the protective cover **1100** to be easily secured to and removed from the wiring panel **700** (FIGS. **7A-B**) without unfastening the wiring panel **700** (FIGS. **7A-B**) from the electrical box **600** (FIGS. **6A-B**), as described with respect to FIG. **12**, below. The plug opening **1170** allows a standard AC plug to access the wiring panel socket **730** when the protective cover is in place, as described with respect to FIG. **14B**, below.

Protective Cover Installation

FIG. **12** illustrates a protective cover **1100** during installation over a wiring panel **700**. The protective cover **1100** is installed in the interior of the electrical box **600** (FIGS. **6A-B**) and positioned so as to shield the exposed front side **702** of the wiring panel **700**, as described with respect to FIG. **14B**, below. The fasteners **707** corresponding to the mounting holes **1160** are removed from the wiring panel **700**. The fasteners **707** corresponding to the cutouts **1150** are not removed during installation or removal of the protective cover **1100**, allowing the wiring panel **700** to remain secured inside the electrical box (not shown). As shown in FIG. **12**, the protective cover **1100** is

positioned within the electrical box (not shown) adjacent the wiring panel **700** so that the protective cover front side **1112** is away from the wiring panel front side **730** and the protective cover plug opening **1170** aligns with the wiring panel socket **730**. In this position, the protective cover **1100** is simply pressed against the wiring panel **700** so that the top panel fixture **710** fits within the top sleeve **1120**, the bottom panel fixture **720** fits within the bottom sleeve **1130** and the cutouts **1150** fit around the remaining fasteners **707**. The protective sleeve **1100** then may be secured to the wiring panel **700** with the removed fasteners **707** threaded through the protective cover mounting holes **1160**, the wiring panel mounting holes **708** (FIG. 7C) and the electrical box panel mounting posts **620** (FIGS. **6A-B**). Removal of the protective cover **1100** from the wiring panel **700** prior to module installation simply proceeds in the reverse of the above-described steps. The top sleeve **1120** and bottom sleeve **1130** provide a gripping surface for removing the protective sleeve **1100**.

Box Mount And Electrical Box Installation

FIGS. **13A-C** illustrate an electrical box **600** mounted on a box mount **500**. The electrical box **600** is typically mounted after the box mount **500** is installed on a wall stud, as described with respect to FIG. **14A**, below. FIG. **13A** illustrates the installation of the electrical box **600** on the box mount **700** and illustrates the releasable latch **650** within the electrical box **600** used to lock the electrical box **600** in a fixed position relative to the box mount **500** and, correspondingly, release the electrical box **600** so that it can be moved to another fixed position. FIGS. **13B-C** illustrate the various fixed positions of the electrical box **600**.

As shown in FIG. **13A**, the electrical box **600** is mounted so that the slides **630** are movably retained within the mounting brackets **530** and the guides **640** are moveable within box mount grooves **540** (FIGS. **6A-B**). The releasable latch **650** has a tab portion **654** (FIGS. 6A-B) that fits within box mount catch slots **560** (FIGS. **13B-C**) to lock the electrical box **600** at various fixed positions. The latch **650** is released and the electrical box **600** moved to different positions by inserting a screwdriver tip or similar tool into a latch release portion **1310**. The screwdriver is then twisted so that the screwdriver tip pushes the release portion **1310** away from the electrical box wall,

temporarily lifting the tab portion **654** from a catch slot **560** (FIGS. **13B-C**). With the latch **650** released, the electrical box **600** can be repositioned along the box mount **500** or removed from the box mount **500** utilizing the finger grip **670** to pull or push the electrical box **600** along the mounting brackets **530**.

As shown in FIGS. **13B-C**, the electrical box **600** can be releasably locked in any one of several fixed positions. Each of these fixed positions locates the front face **602** a specific distance from the box mount leading edge **502**. The box mount **500** is installed on a wall stud, and the leading edge **502** functions as an alignment guide along an edge of the wall stud, as described with respect to FIG. **14A**, below. The tab portion **654** of the electrical box latch **650** (FIG. **13A**), releasably engages any one of several catch slots **560**, which are located at measured positions along the box mount **500**. In this manner, the electrical box **600** is positioned so that its open front face **602** is flush with an installed wall panel, advantageously accommodating various wall panel thicknesses. Position indicators **660** align with the leading edge **502** to visibly indicate the distance from the leading edge **502** to the open face **602** associated with the various catch slots **560** and, hence, the various fixed positions of the electrical box **600**.

As shown in FIG. **13B**, the electrical box **600** is locked in a first position. A particular catch slot **1324** retains the latch tab portion **654**, and a corresponding position indicator **1322** aligns with the leading edge **502**, visibly indicating 1.25 inches. Thus, the electrical box front face **602** extends from the box mount leading edge **502** and, hence, a wall stud edge, by 1.25 inches.

As shown in FIG. **13C**, the electrical box **600** is locked in a second position. A particular catch slot **1334** retains the latch tab portion **654**, and a corresponding position indicator **1332** aligns with the leading edge **502**, visibly indicating 1.75 inches. Thus, the electrical box front face **602** extends from the box mount leading edge **502** and, hence, a wall stud, by 1.75 inches. In a particular embodiment, the electrical box front face **602** can be extended from the box mount leading edge **502**, and hence a wall stud edge, at specific distances in the range of between .5 inches and 1.75 inches. In another particular embodiment, the electrical box front face **602** can be extended from the box

mount leading edge **502**, and hence a wall stud edge, at specific distances of 0.5, 0.625, 1.25 and 1.75 inches.

The electrical box **600** is described above as having a latch with a tab portion that engages catch slots located along the box mount **500**. Other mechanisms for locking the electrical box **600** at various fixed positions relative to the box mount **500** are also contemplated as within the scope of the present invention. For example, the electrical box **600** could have various catch slots, with a latch located on the box mount **500**. The catch slots could be any shaped aperture, which is engaged with a correspondingly shaped tab portion of the latch.

The box mount **500** is described above as having a leading edge that functions as an alignment guide. Other features of the box mount could also function as an alignment guide within the scope of the present invention. For example, a feature, such as an arrow or similar indicator could be molded or otherwise attached to the box mount and used as an alignment guide.

Installation At Rough Framing Phase

FIGS. **14A-B** illustrate a mounted electrical box and associated components installed on a wall stud. FIG. **14A** illustrates a partial electrical box assembly **1400** including a box mount **500** attached to a wall stud **1402**, a mounted electrical box **600** and an installed wiring panel **700**. FIG. **14B** illustrates a shielded partial electrical box assembly **1460** including a protective cover **1100** installed over the wiring panel **700** (FIG. **14A**) of the partial electrical box assembly **1400** (FIG. **14A**).

As shown in FIG. **14A**, the box mount **500** is attached to a wall stud **1402** by aligning the box mount leading edge **502** as a guide along the stud's wall-facing edge **1404** and hammering in the fasteners **522**, which can be staples, nails or similar devices. The electrical box **600** is then attached to the box mount **500**, as described with respect to FIG. **13A**, above. This alignment in conjunction with the box mount fixed positions **560** (FIGS. **13B-C**) provides a specific distance from the wall stud to the electrical box opening **602**, allowing the electrical box to be installed flush with a wall panel finished exterior surface, i.e. the surface typically painted during the makeup phase, as described with respect to FIGS. **13B-C**, above.

Also shown in FIG. **14A** is an installed wiring panel **700**. The wiring panel **700** is installed within the electrical box **600** by positioning the wiring panel **700** at the box open front **602** so that the mounting post slots **706** fit over the mounting posts **620**. The wiring panel **700** is then inserted into the electrical box **600** until the wiring panel back side **704** (FIG. **7B**) abuts the panel mounting posts **610** (FIGS. **6A-B**). The wiring panel **700** is secured within the electrical box **600** against the panel mounting posts **610** (FIGS. **6A-B**) by inserting fasteners **707**, which are screws or equivalent devices, through the mounting holes **708** (FIGS. **7A-B**) and into the panel mounting post centered holes **612** (FIGS. **6A-B**). The grips **709** are used to manually grasp and position the wiring panel **700** during installation. One grip **709** also allows access to the electrical box latch **650** (FIG. **13A**), for positioning the electrical box after installation of the wiring panel **700**.

FIG. **14A** shows the partial electrical box assembly **1400** as it would appear in the rough phase or during replacement of a defective module. The wiring panel **700** partitions the electrical box interior into a user accessible module compartment **400** between the front face **602** and the wiring panel front side **702** and a user inaccessible wiring compartment (not visible) between the back face **604** (FIG. **6B**) and the wiring panel back side **704** (FIG. **7B**). The term user accessibility as used herein is understood to mean access without removal of the wiring panel **700**. The module compartment **400** is dimensioned for installation of an outlet module **800** (FIGS. **8A-B**), switch module **900** (FIGS. **9A-B**) or similar module, such as a dimmer switch. The wiring compartment contains cable connectors for installation of power cables by a journeyman electrician.

As shown in FIG. **14A**, the partitioning of the electrical box interior advantageously allows access only to the module compartment **400**, which is physically separated from the exposed wiring of the power cables within the wiring compartment (not visible). There is no access to the building electrical wiring without physical removal of the wiring panel **700**, preserving the integrity of the electrical wiring from third-party tampering and protecting third-parties from the shock hazard of exposed high voltage conductors. Further, there are no external parts to interfere with wall panel installation, and there are no exposed cables within the module compartment **400**

susceptible to fouling or damage during the makeup building phase. Access to the module compartment, however, which has shielded, snap-in contacts, as described with respect to FIG. **7B**, above, allows easy and comparatively safe installation or replacement of modules by unskilled personnel.

Prior to module installation, which would typically occur after the makeup phase is complete, a socket **730** is available for accepting a standard AC plug, providing electrical power at the construction site after verification that the wiring panel **700** is properly wired. Punch-outs or other panel markings (not shown) indicate how the panel **700** is wired, such as full hot, half hot, SPST switch, DPST switch, 3-way switch, 4-way switch as described with respect to FIGS. **15-16**, below.

As shown in FIG. **14B**, the protective cover **1100** shields the interior of the electrical box **600** and, in particular, the exposed front side of the wiring panel **700** (FIG. **14A**). In this manner, the electrical box **600** and wiring panel **700** (FIG. **14A**) are advantageously protected from drywall compound, paints and other materials used during wall panel installation. Prior art wiring assemblies, during this makeup phase, have exposed power cables simply coiled up and pushed into bare electrical boxes, exposing the wires to fouling and damage from routers used during wall panel installation, as described above. On the other hand, nothing is exposed to fouling or damage in the partial wiring assembly **1460** of the present invention. After the makeup phase is complete, the shield **1100** can be easily removed, as described with respect to FIG. **12**, above. The protective cover **1100** has a plug opening **1170** (FIG. **11**) corresponding to the wiring panel socket **730** (FIG. **14A**), allowing a standard AC plug **1490** to be inserted through the protective cover **1100** and into the socket **730** (FIG. **14A**) for access to electrical power without removal of the protective cover **1100**, e.g. during the makeup phase.

Adapter Wiring Panel

FIG. **15** illustrates an adapter wiring panel **1500**, which has a wiring panel **700** (FIGS. **7A-B**) modified with adapter brackets **1510**. The adapter brackets **1510** each have a post **1520**, an end piece **1530** and a clip **1540**. The post **1520** is fixedly attached to the board **701**, extending perpendicularly away from the front face **702**. The end

piece **1530** is attached to the end of the post **1520** distal the board **701**. The clip **1540** is attached to the end piece **1530** perpendicularly to the post **1520**. Mounting holes **1532** are provided in each end piece **1530**. The adapter wiring panel **1500** is installed within a standard electrical box **100** (FIG. **1**) with the clips **1540** attached along the top and bottom box edges and secured with screws **130** (FIG. **1**) or equivalent fasteners inserted through the mounting holes **1532** and into the mounting posts at the top and bottom of the electrical box **100** (FIG. **1**). In this manner, a standard electrical box **100** (FIG. **1**) can be converted to a safety electrical outlet and switch system that accepts snap-in outlet and switch modules according to the present invention. Conveniently, the adapter board can be installed in lieu of a wiring panel **700** (FIGS. **7A-B**) in the electrical box **600** (FIGS. **6A-B**) utilizing the clips **1540** rather than securing a wiring panel **700** (FIGS. **7A-B**) with fasteners **707** (FIG. **7C**).

The safety electrical outlet and switch system has been disclosed in detail in connection with various embodiments of the present invention. These embodiments are disclosed by way of examples only and are not to limit the scope of the present invention, which is defined by the claims that follow. One of ordinary skill in the art will appreciate many variations and modifications within the scope of this invention.